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GB00/1082

REC'D 20 JUN 2000
WIPO PCT

The Patent Office
Concept House
Cardiff Road
Newport
South Wales
NP10 8QQ

09/936635

I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

I also certify that the attached copy of the request for grant of a Patent (Form 1/77) bears an amendment, effected by this office, following a request by the applicant and agreed to by the Comptroller-General.

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Dated 3 APR 2000

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1/77

31MAR99 E436640-1 C43903
P01/7700 0.00 - 9907304.1

# Request for grant of a patent

*(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)*

The Patent Office

Cardiff Road
Newport
Gwent NP9 1RH

1. Your reference

PWVD 5912-2

2. Patent application number
*(The Patent Office will fill in this part)*

31 MAR 1999

9907304.1

3. Full name, address and postcode of the or of each applicant *(underline all surnames)*

JOHN NORTH
21 BRIAR COURT, GUARDIAN ROAD,
NORWICH, NORFOLK, NR5 8PR.

Patents ADP number *(if you know it)*

If the applicant is a corporate body, give the country/state of its incorporation

7482763002

4. Title of the invention

PRESSURE WASHING AND VACUUM DRYING MACHINE FOR GARMENTS.

5. Name of your agent *(if you have one)*

J. NORTH HYDRATHERM ENERGY INTERNATIONAL

"Address for service" in the United Kingdom to which all correspondence should be sent *(including the postcode)*

21 BRIAR COURT, GUARDIAN ROAD,
NORWICH, NORFOLK, NR5 8PR.

KEITH W NASH & Co
90-92 REGENT STREET
CAMBRIDGE
CB2 1DP

Patents ADP number *(if you know it)*

F5177

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and *(if you know it)* the or each application number

| Country | Priority application number *(if you know it)* | Date of filing *(day / month / year)* |
|---|---|---|
| | | 31.3.2000 |

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

| Number of earlier application | Date of filing *(day / month / year)* |
|---|---|
| GB 9906800.9 | 25th MARCH 1999 |

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? *(Answer 'Yes' if:*

*a) any applicant named in part 3 is not an inventor, or*

*b) there is an inventor who is not named as an applicant, or*

*c) any named applicant is a corporate body.*
*See note (d))*

# PRESSURE WASHING AND VACUUM DRYING MACHINE FOR GARMENTS

## FIELD OF INVENTION

The invention concerns the hybrid combined washing and drying laundry machine, using a pressurised capsule washing drum and a high vacuum dehydration, strong suction drying cycle.

## BACKGROUND OF THE INVENTION

The invention falls into the field of domestic and industrial washing and drying machines.

All existing washing and drying machines operate at a negative pressure using a rotary drum, with either top or front loading.

The method of washing clothes within a gas tight container is not a new idea, it was first patented under the name Wonder Clean. This unit is a small, table - top portable washer and is hand operated.

My invention, is fully automatic and electrically operated, it is a more advanced system, utilizing a pressure pump which increases the vapour pressure at a much grater rate than anything previously on the market. The drum is capsular with a central fine sieve type filter screen.

The existing drying cycle is operated by condensation formed with hot air that is blown into the drum. This removes the moisture contained in the garments.

Conventional washing machines are all designed in a known manner with electric motors and heaters, as described by the patents cited.

My invention provides for about 96% time and energy saving, due to the pressure capsule washing drum which rotates and tumbles the laundry. The the axis of which being perpendicular to the axis of rotation.



The high vacuum pump, provides a strong suction dehydration action for the rinse and drying cycles.

## SUMMARY OF THE INVENTION

The present invention employs a pressurised capsule washing drum, with convex dished outer ends, with one or two end sieve type filters with internal conduit suction ducts, or a central internal cylindrical high vacuum raised sleeve shaped filter sieve type fine perforation screen, in order to protect the laundry, whilst ensuring that all residual water is fully emptied, by suction during the rinse and continuous dehydration drying cycle, via the pressurised three port conduit high vacuum pump, to create a strong suction force above 760 mm Hg.

The operation of the vacuum jet pumping apparatus, is via a venturi tube with peripheral air ducts, set around the outside of the venturi outlet, which accelerates the flow, the venturi tube is connected to the branch inlet, at the point of the 90° bend radius, relative to the centreline of the tube o/d, to provide a strong suction source for vacuum.

The centrifugal pump delivers the water through the venturi supply tube at between 150 psi to 300 psi, depending on the application domestic or industrial.

The centrifugal air blower feed tube is connected to the peripheral air chamber to control air flow, around the venturi which in turn controls the suction force. Atmospheric pressure at 14.72 psi produces the highest vacuum, an increase in pressure causes cavitation within the flow and reduces the strength of the vacuum from 760 mm Hg down to 300 mm Hg.

The suction force is controlled through the air pressure relief valve, not shown.

washing and vacuum drying machine, to reduce the washing and drying cycle times from 200 minutes, down to 5 to 8 minutes reducing the time by 192 minutes. Further objects and advantages of the present invention will become apparent when the description is read in view of the accompanying drawings which are made a part of this specification.

1 : Smaller electric motor, drive speed only 50/60 rpm.

2 : Low water consumption, 25/30 ltres for 5 kg load.

3 : variable temperature short wash, rinse and drying cycles, automatic crease guard action, high pressure rinse cycle. Washing 3 to 5 minutes, rinse 1 minute and vacuum drying 1 to 2 minutes.

4 : Fabric care with gentle rotation. No heat is required for drying.

5 : Gives a superior wash and dry to the present class "A" wash and dry claims, with all loads, due to the pressure of the gases permeating the garments.

6 : The efficiency of the pressurised gases permeating through the garments when washing and vacuum used for drying, saves water, electricity and detergent.

7 : Drying through dehydration, controlled by a variable strong suction due to the high vacuum. No heat for drying reduces wear and tear on garments.

8 : Low electrical energy consumption, 400 washes per year with the present system uses 2,216 kWh year, at .07 pence per kWh = £156.00 per year saving.



The present Invention would use 130.36 to 208.56 kWh year at a cost of £9.13 to £14.60, that is a saving of 96%.

9 : Low water consumption per year, present 15,000 ltres, new 5,000 to 6,000 ltres.

10 : The design has eliminated the age old problem of vibration in washing machines. The lightness of the new design enables ease of movement.

## BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 shows : a side elevation view partially in section of a capsule washing drum front loading machine.

Figure 2 shows : a top longitudinal elevation view partially in section of a capsule washing drum.

Figure 3 shows : a radial elevation of a capsule washing drum, through the central section A-A of the internal sleeve fine suction filter.

Figure 4 shows : a front elevation partially in section of a capsule washing drum machine.

Figure 5 shows : a schematic sectional view of a rotary swivel joint connected to the vacuum venturi pump.

Figure 6 shows : a diagrammatic view partially in section of a venturi vacuum jet pump.

Figure 7 shows : a schematic of a centrifugal pump for suction control.

Figure 3 : discloses radial cross section of the capsule washing drum through section A-A inside Item 7, wall of capsule Item 6, central filter sleeve Item 5, axial drive shafts Item 2, and 3, washing inlet Item 1, supply and vacuum inlet Item4.

Figure 4 : discloses a front elevation cross section of a capsule washing drum machine showing cabinet frame Item 1, control panels Item 2, and 3, water supply inlet.

Item 4, detergent mixing drawer Item 5, supply tube to heater tank Item 8, cold water supply tube to drawer Item 6, capsule washing drum Item 9, bearing block Item 10 and 11, retaining bolts Item 12, bearing or bearing material Item 14, washing inlet Item 22, axial drive shaft Item 13, electrical cable Item 7, capsule support frame Item 15, heater tank Item 17, electric motor and pump Item 20, capsule drive motor Item 21, drive belt Item 16.

Figure 5 : discloses a rotary swivel joint showing suction port Item17, stationary 90° inlet/outlet tube bend Item 7, rotary swivel fitted to the axial drive shaft on the capsule washing drum Item 10, male rotary body Item 9, female pin retainer Item 8, metal to metal outer seal Item 12, front seal Item 13 rear seal Item 16, central seal and retainer Item 11, and 14, bearing Item 15.

Figure 6 : discloses a schematic front elevation partially in section of a venturi jet high vacuum pump with a centrifugal air pump controller, to control suction strength, showing high pressure water inlet Item 19, venturi inlet Item 4, venturi aperture Item 3, centrifugal air pump Item 1, air inlet Item 18, air chamber Item



2, peripheral air ducts Item 5, branch venturi inlet Item 6, to center line of the 90° radius I/D tube bend Item 7.

Figure 7 : shows a schematic of a centrifugal pump Item 1, air inlet Item 18.

Figure 8 : discloses a side elevation view partially in section of a top loading capsule washing drum machine showing outer cabinet shell Item 9, adjustable leveling feet Item 10, capsule washing drum Item 1, press twist lock pressure cap Item 33, top loading door Item 2, rotary transparent glass door Item 2, bearing block retaining axial drive shafts Item 3, and 24, support frame for capsule drive shafts Item 4, and 17,water and detergent supply tube to heater tank Item 5, water heater Item 16, controls Item 6, detergent drawer Item 7, water supply to drawer Item 8, suction inlet to pump from heater tank Item 11, electric motor Item 12, drives water-detergent pump Item 13, water-detergent supply tube Item 15, 26, and 20, to control valve and drain outlet Item 25, for supply to the capsule washing drum through the solenoid valve rotary swivel joint Item 23, vacuum tube Item 27, venturi tube Item 28, air supply tube Item 29, centrifugal air motor/pump Item 30, air inlet to pump Item 31, electric drive motor and reduction gearing Item 14, motor drive pulley Item 21, capsule washing drum drive pulley Item 32, drive belt Item 22, hot water in Item 19, cold water in Item 18.

Figure 9 : discloses a diagrammatic view of a pressure/vacuum capsule washing drum machine showing washing machine cabinet shell Item 7, dual loading door Item 6, and the controls Item 1, and 2, detergent loading drawer Item 3.

Figure 10 : shows a diagrammatic view of

mixture as it enters the capsule. The single end filter inside the capsule, enables the capsule drum, top loader always to stop in the vertical upright plane, and the central filter will also stop the capsule in the horizontal plane.

Claim 3 : a method is claimed for the use of a a transparent dual rotating inner door connected to a stationary outer door, connected to a central member, for sealing against the cylindrical inner seal that is set inside the laundry loading aperture of the axial drive shaft of the capsule washing drum.

Claim 4 : a method is claimed for the use of a venturi type vacuum pump in a washing or drying machine. For emptying the washing the washing liquid, rinsing water and for removing water and moisture from the garments

Claim 5 : a method is claimed for the use of a air pump to control suction strength in conjunction with a venturi type jet pump. This provides for some moisture to remain within the garments if so required.

Claim 6 : a method is claimed for the use of a mechanical/rotary driven capsule type washing drum, front loading or top loading, with or without a vacuum drying system.

Claim 7 : a method is claimed for the use of a capsule type drum as disclosed within the patent for the use as a dry cleaning unit.

Claim 8 : a method is claimed for the use of a rotary swivel drive joint, with a delivery and discharge solenoid operated multi port valve (not shown) for use with a pressure capsule washing drum machine.



Claim 9 : a method is claimed for the use of a drive belt or gearing to rotate the capsule washing drum.

Claim 10 : a method is claimed for the use of a LCD or similar bright bar type displays as disclosed within the patent.

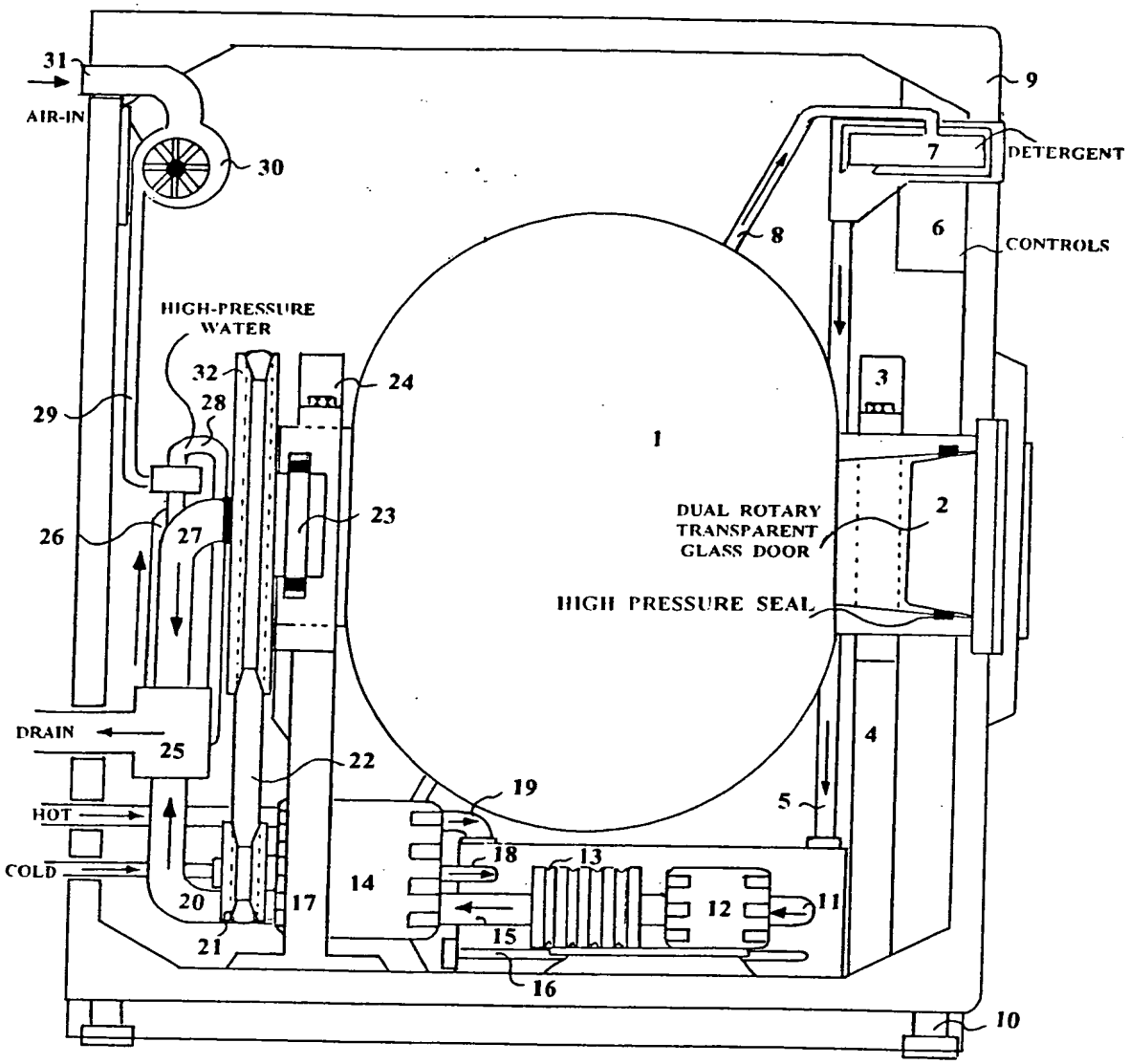
Claim 11 : a method is claimed for the use of a separate heater tank as disclosed within the patent or a combined inner and outer shell capsule as the heater tank.

Claim 12 : a method is claimed for the use a single lower sieve type filter screen and an internal type conduit to draw the vacuum within a top loading capsule washing drum, the garments inside would always drop to the bottom of the capsule by gravity, due to suction the moment the vacuum cycle starts, this will always place the loading aperture to the top of the machine, in the vertical upright plane.

Claim 13 : a method is claimed for the use of any type of sealing arrangement which can be used to provide a pressure seal between the inner rotating transparent glass door and the capsule washing drum as disclosed within the patent.

********** **********

FIGURE 1


31
AIR-IN
30
9
DETERGENT
7
6
CONTROLS
8
HIGH-PRESSURE
WATER
32
24
29
28
3
1
DUAL ROTARY
TRANSPARENT
GLASS DOOR
2
26
27
23
HIGH PRESSURE SEAL
DRAIN
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22
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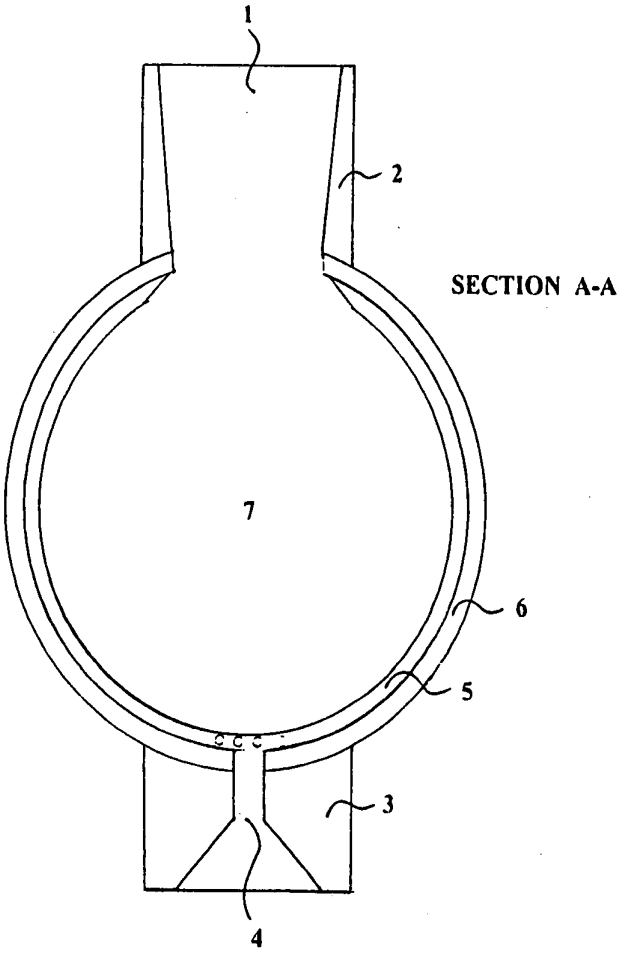
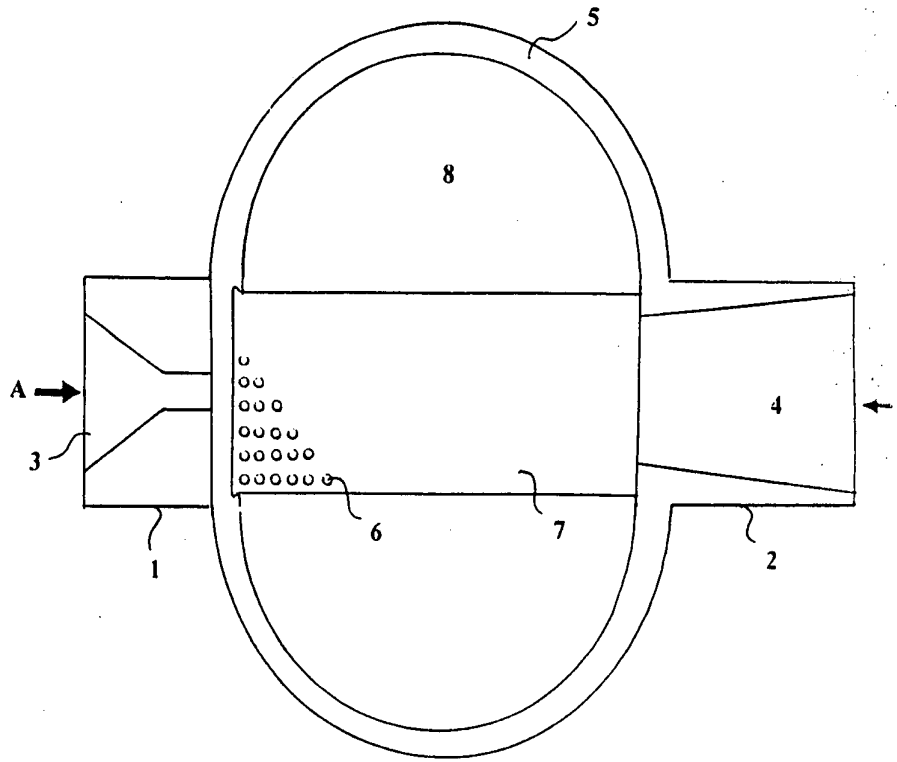
FIGURE 3




SECTION A-A

FIGURE 2



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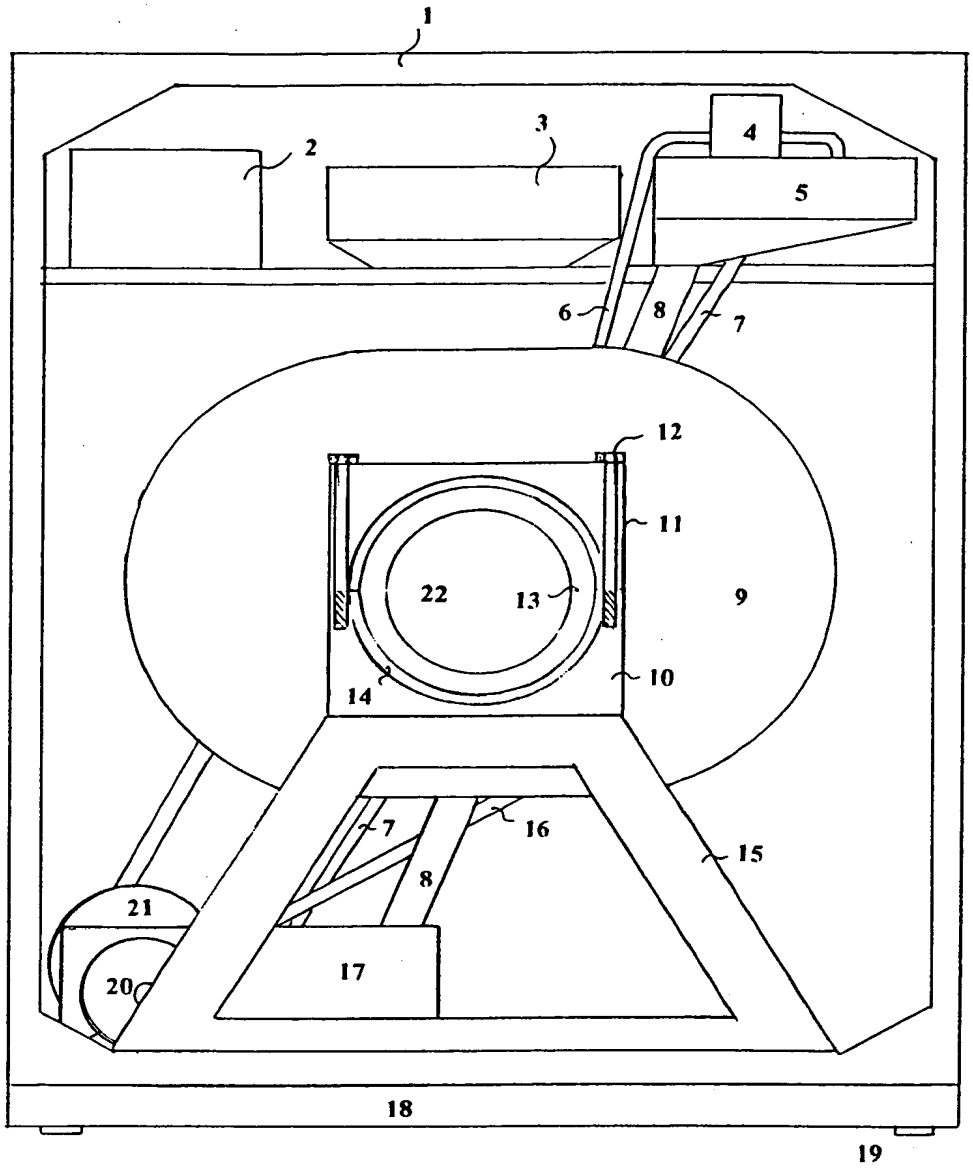


FIGURE 5

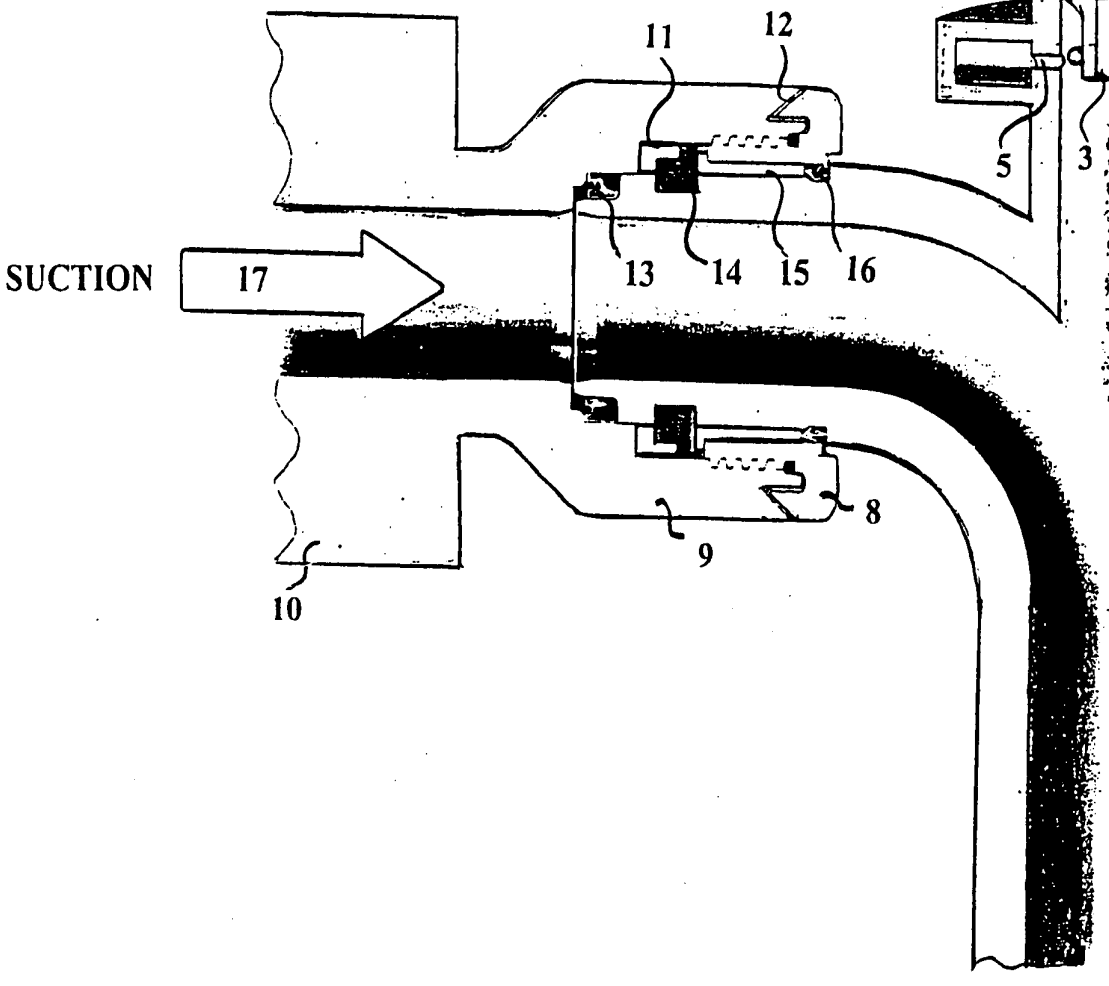



FIGURE 6

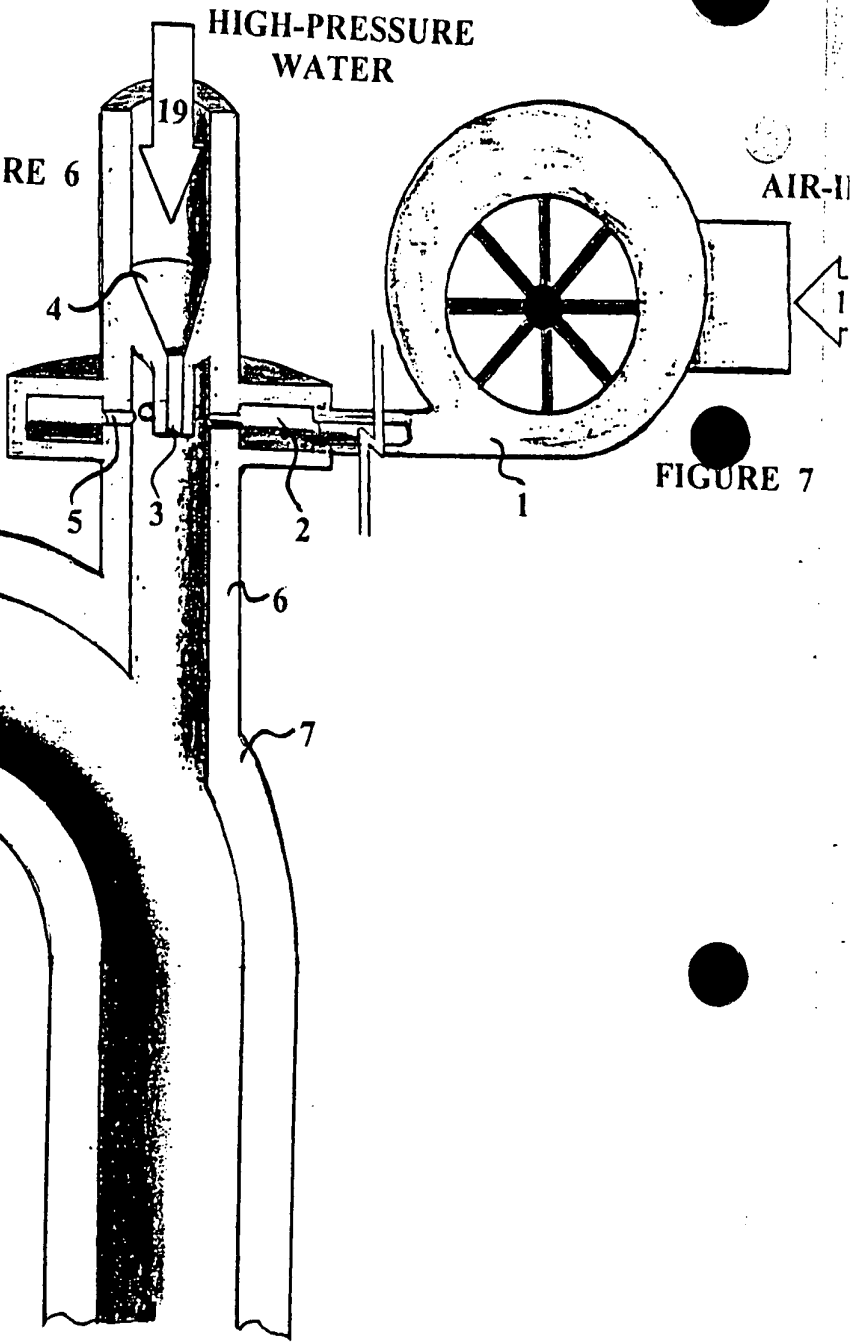



FIGURE 7

IGURE 8

TOP LOADING

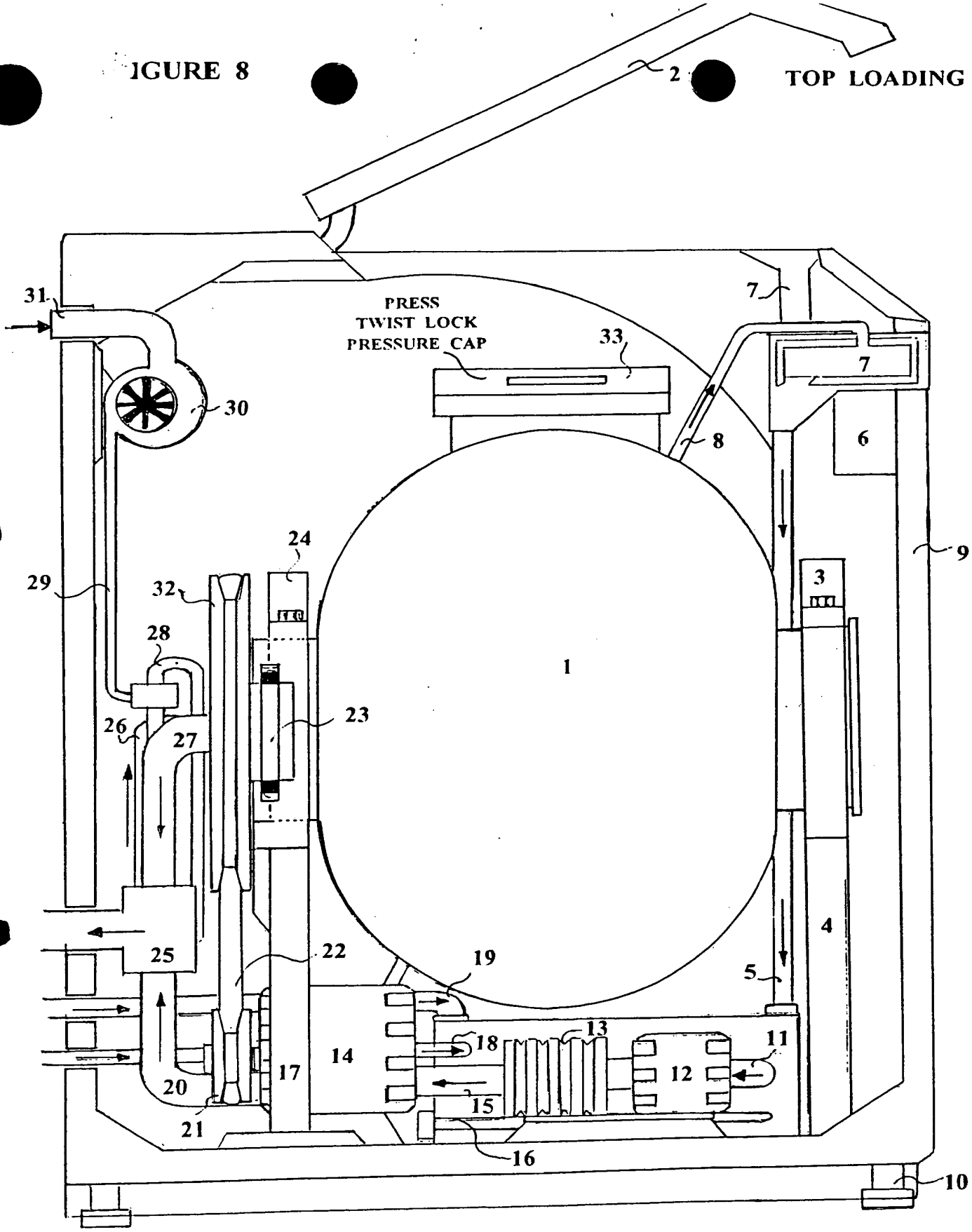
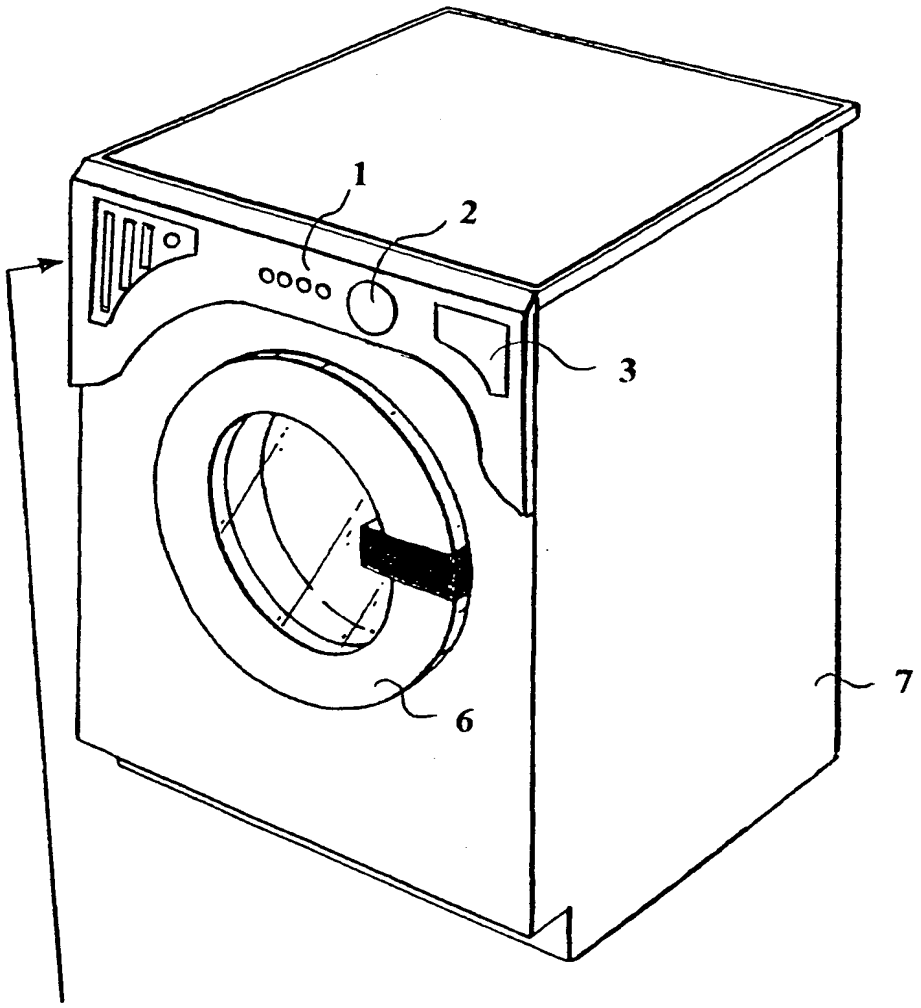


FIGURE 9



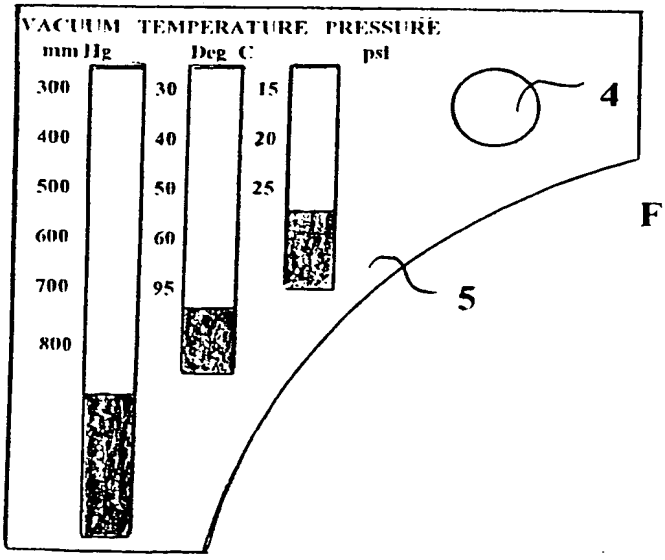
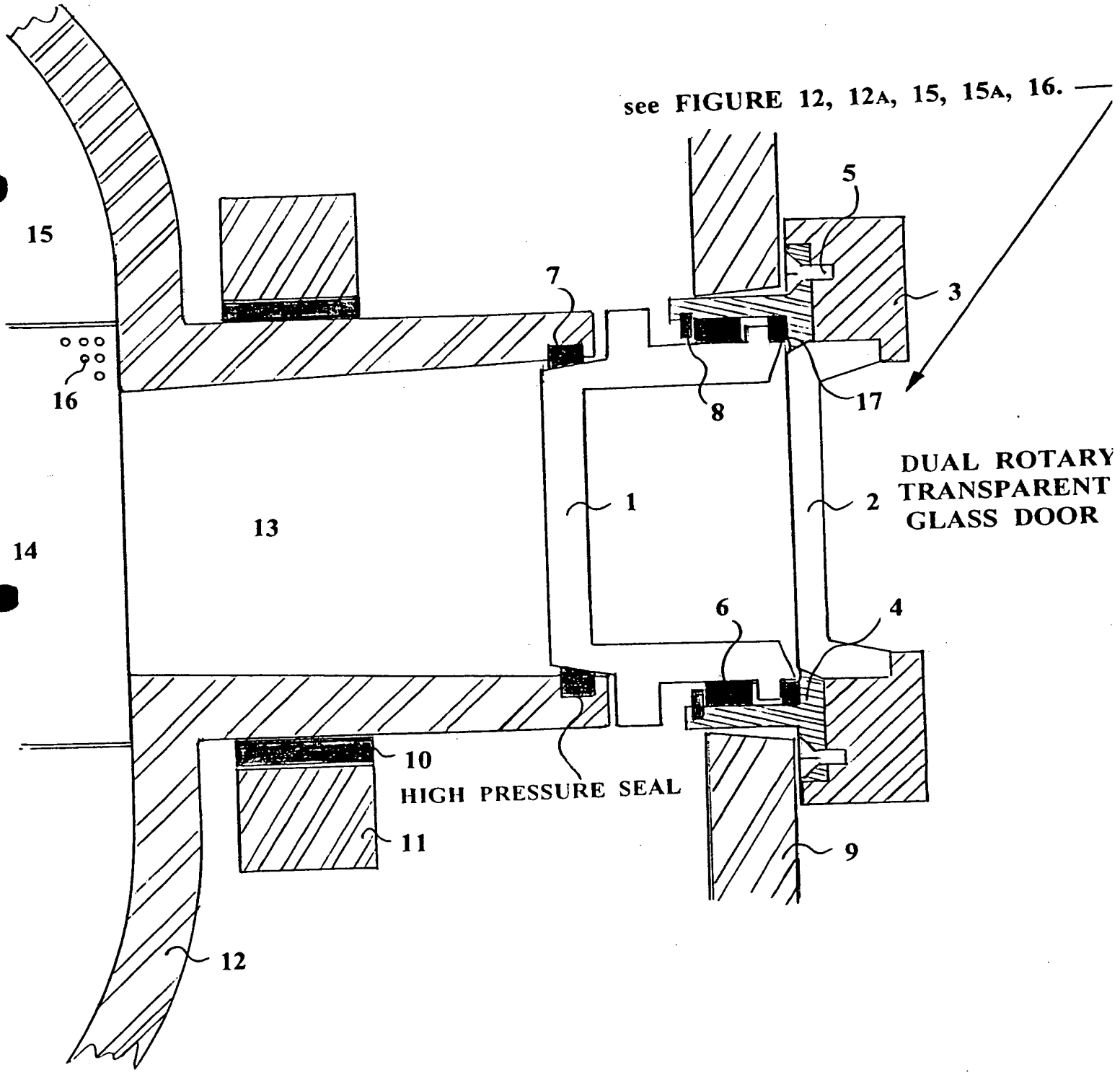




FIGURE 10

FIGURE 11


see FIGURE 12, 12A, 15, 15A, 16.
15
16
7
5
3
8
17
DUAL ROTARY
TRANSPARENT
GLASS DOOR
1
2
13
14
6
4
10
HIGH PRESSURE SEAL
11
9
12

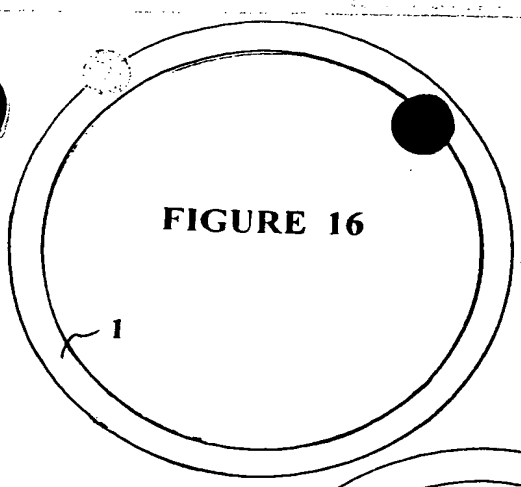



FIGURE 16

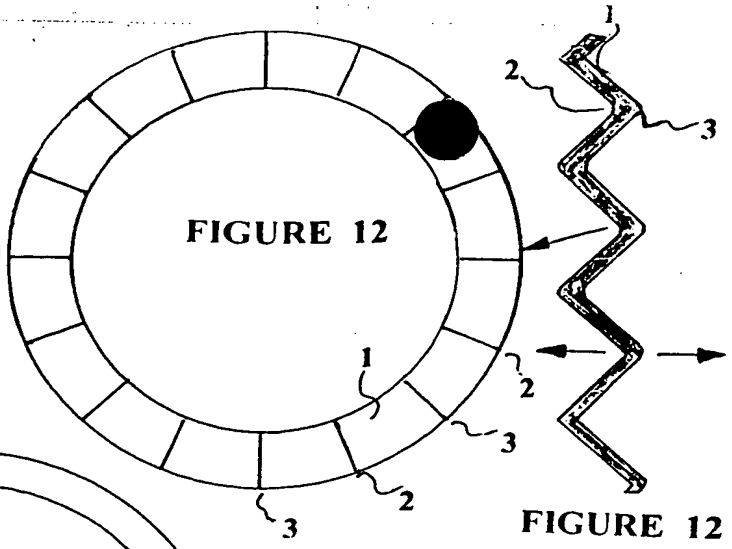



FIGURE 12

FIGURE 12 A

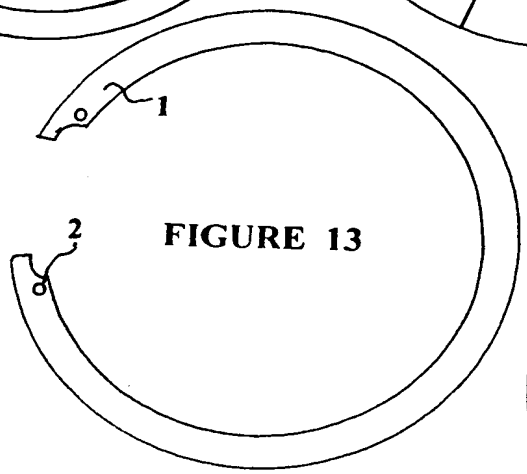



FIGURE 13

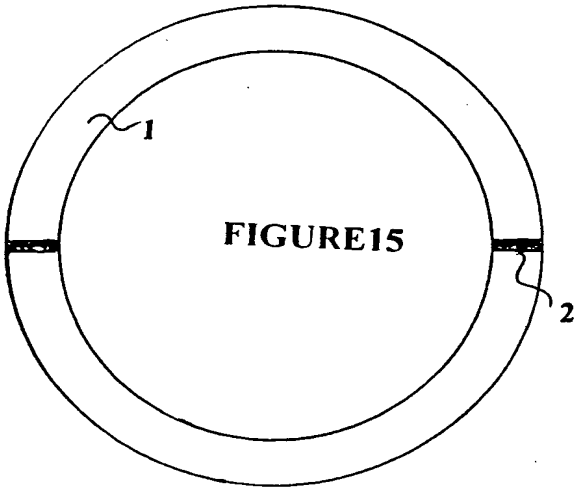



FIGURE15

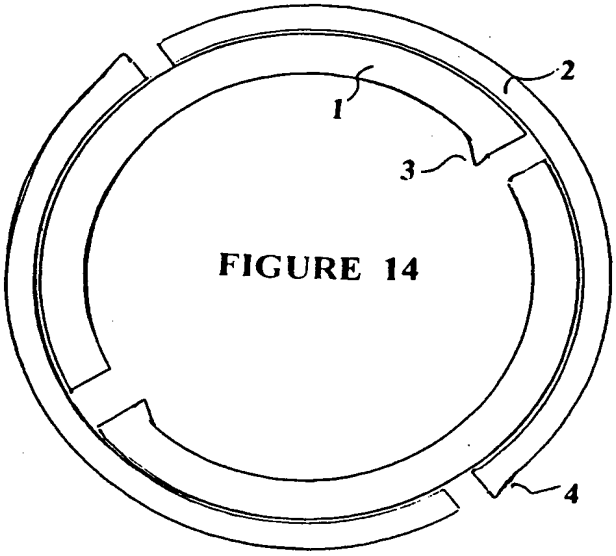



FIGURE 14

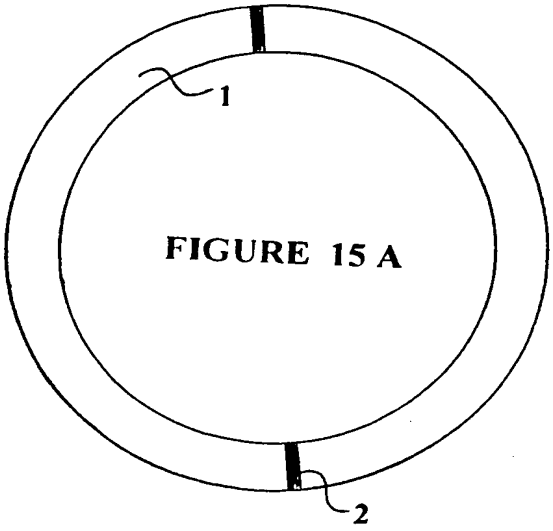



FIGURE 15 A

FIGURE 17

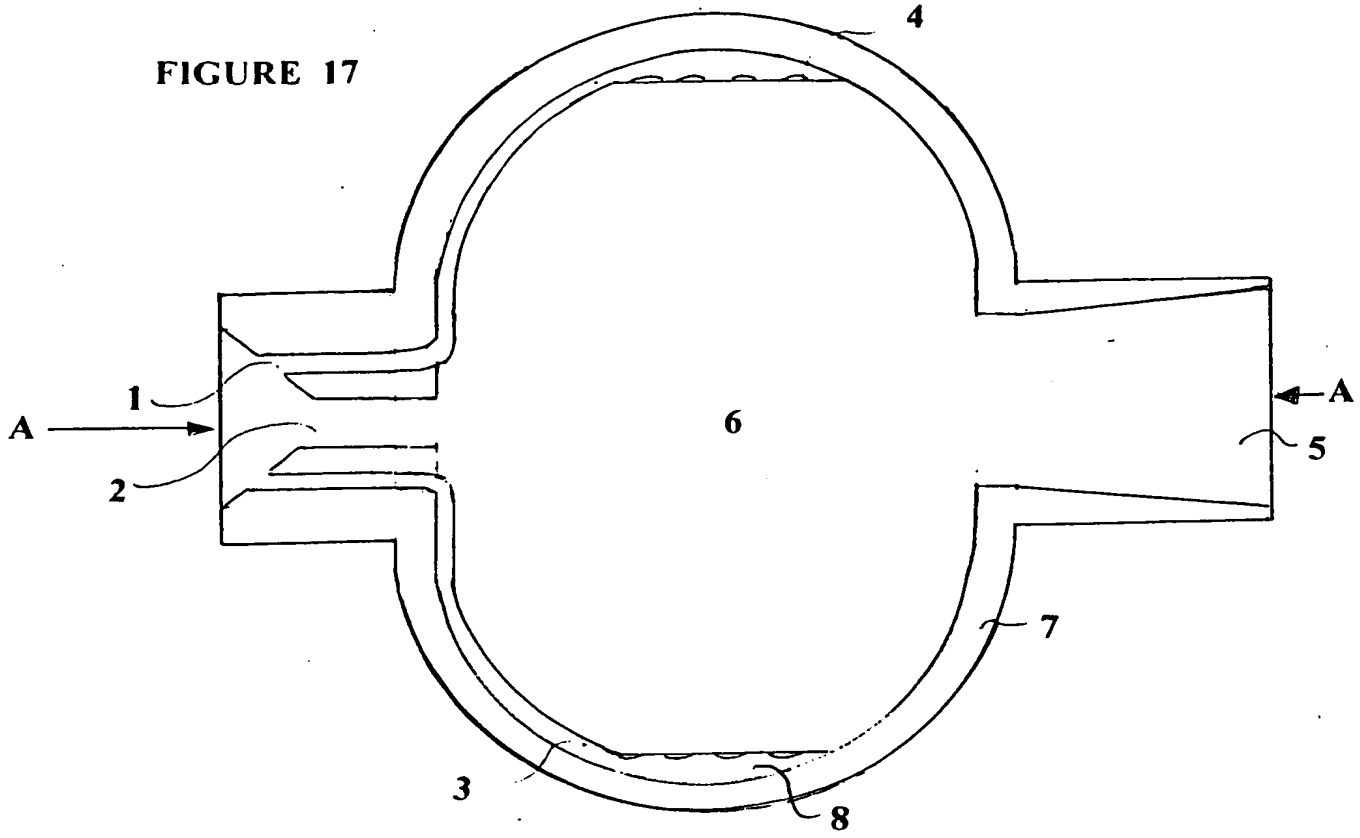



FIGURE 18